CLAIMS

We claim:

1. A vapor compression system for use with a working fluid, comprising:

a compressor operable to increase the pressure and temperature of the working fluid;

a condenser operable to absorb heat from the working fluid;

an expansion valve operable to decrease the pressure of the working fluid;

an evaporator operable to transfer heat to the working fluid; and

a charging element operable to apply an electric charge to the working fluid.

2. The vapor compression system of claim 1 wherein the charging element is formed of a material ~~that has a triboelectric working function that~~ is substantially different than the triboelectric working function of the working fluid.

3. The vapor compression system of any of the foregoing claims wherein the charging element is positioned so that the working fluid flows over a surface of the charging element.

4. The vapor compression system of claim 3 wherein the charging element is configured so that flowing the working fluid over the charging element is operable to triboelectrically charge the working fluid.

5. The vapor compression system of any of the foregoing claims comprising a

fluid path through which the working fluid flows, wherein the charging element is positioned within the fluid path.

6. The vapor compression system of any of the foregoing claims wherein the charging element is formed of glass.

7. The vapor compression system of any of the foregoing claims wherein the charging element is formed of a non-metallic material.

8. The vapor compression system of any of the foregoing claims comprising an insulating element positioned adjacent the charging element wherein the insulating element is formed of a material having a triboelectric working function that is similar to the triboelectric working function of the working fluid.

9. The vapor compression system of any of the foregoing claims comprising a fluid path through which the working fluid flows, wherein the charging element is positioned along the fluid path between the expansion valve and the compressor.

10. The vapor compression system of any of the foregoing claims wherein the evaporator comprises an inlet and the charging element is positioned adjacent the inlet.

11. A heat exchange system, comprising:

a working fluid operable to absorb heat:

a fluid path comprising a conduit through which the working fluid flows; and

a triboelectric charging element positioned along the fluid path so that the working fluid flows over a surface of the charging element, wherein the charging element is formed of a material having a triboelectric working function that is substantially different than the triboelectric working function of the working fluid, wherein the working fluid is triboelectrically charged by flowing over the charging element.

12. The heat exchange system of any of the foregoing claims wherein the charging element is formed of glass.

13. The heat exchange system of any of the foregoing claims wherein the charging element is formed of a non-metallic material.

14. The heat exchange system of any of the foregoing claims comprising an insulating element positioned adjacent the charging element wherein the insulating element is formed of a material having a triboelectric working function that is similar to the triboelectric working function of the working fluid.

15. A method for enhancing the performance of a working fluid in a vapor compression system, said method comprising the steps of:

compressing the working fluid to elevate the pressure and temperature of the working fluid;

discharging the working fluid to a condenser to release heat from the working fluid and convert the fluid to a liquid phase;

discharging the working fluid from the condenser to an expansion device to convert the working fluid to a vapor phase;

applying an electrical charge to the working fluid; and

discharging the working fluid from the expansion device and transferring heat to the working fluid.

16. The method of claim 15 wherein the vapor compression system comprises a triboelectric element positioned along the fluid path of the working fluid and the step of applying an electric charge to the working fluid comprises the step of triboelectrically charging the working fluid.

17. The method of claim 16 wherein the triboelectric element is formed of a material that has a substantially different triboelectric working function than the working fluid.

18. The method of any of claims 16 or 17 wherein the step of triboelectrically charging the working fluid comprises flowing the working fluid over a surface of the triboelectric element.

19. The method of any of claims 15-18 wherein the step of applying an electrical charge comprises applying an electrical charge to the working fluid as the working fluid flows along a fluid path between the expansion valve and the compressor.

20. The method of claim 15 wherein the step of applying an electrical charge

comprises the step of triboelectrically charging the working fluid.

21. The method of claim 20 wherein the step of triboelectrically charging the working fluid comprises flowing the working fluid over a surface of the triboelectric element.

22. The method of any of claims 16-18 and 21 comprising the step of positioning an insulating element adjacent the triboelectric element, wherein the insulating element is formed of a material that has a substantially similar triboelectric working function than the working fluid.

23. The method of claim 15 wherein the vapor compression system comprises a conduit for carrying the working fluid and the method comprises grounding a portion of the conduit to dissipate the applied electrical charge.